APPENDIX 1. PROCEDURES FOR OBTAINING FAA APPROVAL FOR IFR/VFR OPERATIONS BY SUPPLEMENTAL TYPE CERTIFICATE OR FAA FORM 337 (FIELD APPROVAL) FOR FOLLOW-ON INSTALLATIONS.

1. APPROVAL OF TECHNICAL DATA BY SUPPLEMENTAL TYPE CERTIFICATE (STC).

a. The STC Applicant:

(1) Makes an application for an STC at the nearest FAA Aircraft Certification Office. Early contact is wise, since scheduling may be critical. FAA evaluates the data submitted by the applicant, issues a Type Inspection Authorization (TIA), and participates in ground/flight tests outlined in paragraph 10. An STC is issued when all airworthiness requirements are met. If the submitted data is adequate, the STC authorizes identical installations in the same aircraft type.

(2) Designs and installs the Omega/VLF system to the criteria set forth in applicable paragraphs of this advisory circular, or consistent with other data acceptable to the Administrator.

(3) Obtains an authorization from the equipment manufacturer to reference the original data for equipment accuracy (per paragraph 9), or conducts the necessary tests.

(4) Makes an aircraft available (with the Omega/VLF system installed) for ground inspection and flight test. The applicant is responsible for furnishing a qualified flightcrew for the required flight tests.

(5) Should submit the following kinds of data for FAA airworthiness evaluation:

(i) Equipment data such as:

A Equipment schematics and system wiring diagrams.

B Equipment manufacturer's operating instructions and installation instructions.

C Equipment manufacturer's quality control procedures (not required if manufacturer's quality control is FAA approved).

D Environmental test data.

NOTE: Equipment data need not be submitted if the equipment has been manufactured under a TSO authorization.

(ii) Fault analysis covering installation.

(iii) Installation information and/or photographs, including antenna and P-static protection devices.

(iv) Structural substantiation as necessary.

(v) Installation wiring diagrams.

(vi) Flight manual revision or supplement, or placard drawings as required (see paragraph 2c of this appendix).

(vii) Evidence of previously approved data.

(viii) Electrical load analysis.

b. The Equipment Manufacturer Can Certify (to the applicant and FAA) that the accuracy criteria in paragraph 9 by reference to the original STC are satisfied, a TSO has been obtained, and that the appropriate environmental tests have been conducted.

2. APPROVAL OF TECHNICAL DATA/INSTALLATION FOR IFR OPERATIONS BY FAA FORM 337 (FIELD APPROVAL).

a. Data Submitted by the Applicant. Alteration data for the equipment installation will be submitted with a properly executed FAA Form 337, and a certification from the manufacturer to confirm that the system accuracy requirements of paragraph 9 have been met.

b. Additional Data Which May Be Required. If required for FAA airworthiness evaluation by the FAA district office approving the technical data/installation, the applicant may also be required to furnish a copy of the equipment data (for equipment not produced under a TSO authorization), manufacturer's operating and installation instructions fault analysis for installation, installation details and/or photographs, substantiation of structural changes, and system wiring diagrams

c. Airplane Flight Manual (AFM) or Rotorcraft Flight Manual (RFM) Supplement. An AFM/RFM supplement (or supplemental flight manual) prepared by the applicant and containing the following information must be presented for FAA approval.

(1) Equipment operating limitations.

(2) Emergency/abnormal operating procedures (if applicable).

(3) Normal procedures for operating the Omega/VLF system and any interfaced equipment.

(4) Procedures for verifying proper operation after power outages.

d. The Applicant Makes an Aircraft Available (with the Omega/VLF system installed) for ground and flight tests, and is responsible for furnishing a qualified flightcrew for the required flight test. The results of the flight test should be made a part of the data submitted. The FAA approving inspector will request to observe the flight test.

NOTE: The FAA inspector will evaluate and sign the AFM supplement or RFM supplement (or supplemental flight manual) presented by the applicant as part of a field approval. Generally, FAA inspectors should have sufficient understanding of the AFM or the RFM to approve a supplement for the Omega/VLF installation without the need for engineering assistance. However, if engineering assistance is needed then the inspector should request it early in the program.

e. Field Approvals of Omega/VLF Installations for IFR should be limited to follow-on installations where the original approval was through the TC or STC process and where the system installation is of the stand-alone kind or where the interfaces with autopilot, flight director, and aircraft equipment is of a simple nature. For example, a simple interface is one which provides a switching arrangement to substitute the Omega/VLF deviation and flag signals for the comparable outputs of one VOR receiver. Field approvals without engineering assistance should not be made when:

(1) The Omega/VLF equipment transfers or accepts data from other navigation systems or computers such as inertial navigation system (INS), Loran-C, or flight management systems;

(2) The aircraft has numerous sources of navigation information installed with a complex switching system; and

(3) The Omega/VLF equipment incorporates a software configuration that has not been FAA approved.

3. APPROVAL OF INSTALLATION FOR VFR OPERATIONS. Approval of Omega/VLF installations for operations under VFR may be obtained by TC, STC, or data field approved by the FAA on an FAA Form 337. If previously approved data is available or the installation can be accomplished by utilizing provisions provided by the airframe manufacturer for standard avionics equipment installations, the installation can then be approved for return to service by one of the entities noted in FAR 43; i.e., repair station, manufacturer, holder of an inspection authorization, etc., provided the installation:

a. Conforms to the acceptable methods, techniques, and practices contained in AC 43.13-1A, Acceptable Methods, Techniques and Practices -- Aircraft Inspection and Repair, and AC 43.13-2A, Acceptable Methods, Techniques and Practices -- Aircraft Alterations.

b. Does not interfere with the normal operation of other equipment installed in the aircraft. This is accomplished by a ground test and flight test to check that the Omega/VLF equipment is not a source of objectional EMI, is functioning properly and safely, and operates in accordance with the manufacturer's specifications.

c. Does not involve complex switching for integration with other aircraft systems; e.g., flight directors, electronic flight instrument system (EFIS) displays, etc. The Omega/VLF may be coupled to the radio nav function of an

autopilot provided it has a course deviation indicator output that is compatible with the autopilot and the same installation procedures normally used for the VOR coupling are used.

d. Provides a navigation source annunciator if the Omega/VLF installation supplies any information to displays such as an HSI or CDI which can also display data from other equipment normally used for aircraft navigation.

e. Except for items c and d of this paragraph, is completely isolated from all IFR systems.

f. Has an approval recordation contained in an FAA Form 337 and that a placard is in clear view of the pilot which indicates "Omega/VLF Not Approved For IFR."

NOTE: Helicopters approved only for VFR operations do not need placarding.

APPENDIX 2. SAMPLE AIRPLANE FLIGHT MANUAL SUPPLEMENT .

INSTALLATION CENTER/FAA REPAIR STATION #_____
123 Fourth Street Anytown, USA

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
OMEGA/VLF NAVIGATION SYSTEM

AIRPLANE MAKE:

AIRPLANE MODEL:

AIRPLANE SERIAL NUMBER:

AIRPLANE REGISTRATION NUMBER:

This document must be carried in the airplane at all times. It describes the operating procedures for the Omega/VLF System when it has been installed in accordance with (manufacturer's installation manual) and FAA Form 337 dated _____.

For airplanes with a Pilot's Operating Handbook and/or FAA approved Airplane Flight Manual, this document serves as the FAA approved _____ Omega/VLF Flight Manual Supplement. When the Omega/VLF system is installed in an airplane that does not have an FAA approved Airplane Flight Manual, this document serves as the FAA approved Supplemental Flight Manual.

The information contained herein supplements or supersedes the basic Airplane Flight Manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this document, consult the basic Airplane Flight Manual (if applicable).

FAA APPROVED: _____
(Inspector's Name)
Aviation Safety Inspector (Avionics)
ACE-GADO/ACDO/FSDO #_____
Federal Aviation Administration

FAA APPROVED
DATE:_____

INSTALLATION CENTER/FAA REPAIR STATION #_____
123 Fourth Street
Anytown, USA

FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
OMEGA/VLF NAVIGATION SYSTEM

SECTION 1

INTRODUCTION

A. EQUIPMENT DESCRIPTION

Provide a general description of the Omega/VLF Navigation System installed in the aircraft.

B. GENERAL

Provided the _____ Omega/VLF navigation system is receiving adequate usable signals it has been demonstrated capable of and has been shown to meet the accuracy requirements of:

1. VFR/IFR en route RNAV operation within the conterminous United States and Alaska in accordance with the criteria of AC 20-101C, Airworthiness Approval of Omega/VLF Navigation Systems for Use in the U.S. National Airspace System (NAS) and Alaska.

2. Flight in the North Atlantic (NAT) Minimum Navigation Performance Specifications (MNPS) airspace in accordance with AC 91-49, General Aviation Procedures for Flight in North Atlantic Minimum Navigation Performance Specifications Airspace (if applicable).

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SECTION II

LIMITATIONS

A. The _____ Omega/VLF Pilot's Guide, P/N _____, dated _____, (or later revision) must be immediately available to the flightcrew whenever navigation is predicated on the use of the system.

B. Navigation using the _____ Omega/VLF system is limited to the following area(s):

(Define approved operating areas)

C. IFR navigation is prohibited unless the pilot verifies each selected waypoint and navaid for accuracy by reference to current approved data.

(If the equipment incorporates a navigation data base or stored flight plan data, the pilot must verify the currency of this data prior to use.)

D. When using the Omega/VLF, additional equipment required for the specific type of operation must be installed and operable.

E. The Omega/VLF system position must be checked for accuracy (reasonableness) prior to use as a means of navigation and under the following conditions:

1. Prior to each compulsory reporting point during IFR operation when not under radar surveillance or control.

2. Prior to requesting off-airway routing, and at hourly intervals thereafter during RNAV operation off approved RNAV routes.

3. At or prior to arrival at each en route waypoint during RNAV operation along approved RNAV routes.

F. The _____ Omega/VLF should be updated to satisfy RNAV en route accuracy requirements when a cross-check with other onboard approved navigation equipment reveals an error greater than 2 nmi.

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OMEGA/VLF NAVIGATION SYSTEM

G. Navigation cannot be predicated on the use of Omega/VLF guidance while in terminal areas or during departures from or approaches to airports or into valleys; e.g., between peaks in mountainous terrain or below Minimum Enroute Altitude (MEA).

H. Following a period of dead reckoning mode of operation, the system position should be verified and updated, as required, by visually sighting a ground reference point if feasible; and/or by using other installed navigation equipment, such as VOR, DME, TACAN, or a combination of such equipment.

I. During periods of dead reckoning operation, the _____ Omega/VLF Area Navigation System should be used with care.

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SECTION III

EMERGENCY PROCEDURES

A. If sensor information is intermittent or lost, utilize remaining operational navigation equipment as required.

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SECTION IV

NORMAL PROCEDURES

A. OPERATION

Normal operating procedures are outlined in the Pilot's Guide, P/N _____, dated _____, (or later revision).

B. SYSTEM ANNUNCIATORS

Describe each remote annunciator, such as:

1. Waypoint (WPT)

2. Message (MSG)

3. Dead Reckoning (DR)

4. Crosstrack (X-Track) (Parallel-offset)

5. Equipment Status (signal strength, signal status, signal-to-noise ratio, system failure, etc.)

C. SYSTEM SWITCHES

Describe the function and operation of the various switches used with the system.

D. PILOT'S DISPLAY

Describe the pilot's display (i.e., CDI, HSI, RMI, OBS).

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OMEGA/VLF NAVIGATION SYSTEM

E. COPILOT'S DISPLAY

Describe the copilot's display (i.e., CDI, HSI, RMI, OBS).

F. AUTOPILOT OPERATION

Describe the coupling of Omega/VLF steering information to the autopilot.

G. FLIGHT DIRECTOR

Describe the coupling of Omega/VLF steering information to the flight director.

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OMEGA/VLF NAVIGATION SYSTEM

SECTION V

ABNORMAL PROCEDURES

No change.

SECTION VI

PERFORMANCE

No Change

FAA APPROVED
DATE: _____

APPENDIX 3. SAMPLE DATA SHEET TO ATTACH TO FAA FORM 337.

ATTACH TO FAA FORM 337
AIRPLANE MAKE:

AIRPLANE MODEL:

AIRPLANE SERIAL NUMBER:

AIRPLANE REGISTRATION NUMBER:

DATE WORK COMPLETED:

_____ Omega/VLF Navigation System, consisting of the following components, was installed per _____ Installation Manual Number _____, Revision ____, dated _____. The installation conforms to AC 43.13-1A and AC 43.13-2A.

Equipment	Part Number	Serial Number	Software Version
____ Nav Computer	xxx-xx-xxxx	yyyy-zz	ww
____ Antenna	xxx-xx-xxxx	yyyy-zz	-
____ Control/Display	xxx-xx-xxxx	yyyy-zz	ww
____ etc.			

Proper ground operation of the _____ system was confirmed through completion of the system checkout, Section ___, of the Installation Manual. The system was found to meet or exceed all specifications of this section.

A flight check was made to insure that the accuracy requirements of AC 20-101C were met during flight. ( ) YES ( ) NOT APPLICABLE

PLACE OMEGA/VLF ACCURACY DATA IN AIRCRAFT PERMANENT RECORDS (If applicable)

WAYPOINT:

Latitude/Longitude: _____
or
Station Identifier/Frequency: _____

Radial: _____

Distance: _____

Altitude: _____

Perpendicular distance to tangent point: _____

Distance along track from tangent point: _____

MEASURED SYSTEM ERROR:

Along-Track Error _____

Crosstrack Error: _____

ALLOWABLE SYSTEM ERROR FROM AC 20-101C, PARAGRAPH 9:

Along-Track Error _____

Crosstrack Error _____